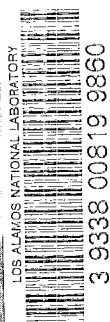


THE ATOM

Los Alamos Scientific Laboratory

July, 1964



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ON THE COVER: Bigger than Rhode Island,
it is the largest national wildlife refuge in the continental
United States and the home of some 1,500 bighorn sheep
like the one pictured on this month's cover. Photo by Bill Jack Rodgers.
A story about the Desert Game Range begins on page 2.

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Short Subjects

Merle E. Bunker of P-2 has been awarded a National Science Foundation Senior Postdoctoral Fellowship for a year-long program of nuclear research at the Institute for Theoretical Physics in Copenhagen, Denmark. Bunker and his wife and two sons will leave for Europe August 4. Bunker has been a LASL staff member since 1950, working mainly in the field of nuclear spectroscopy and in a supervisory capacity with the Water Boiler reactor. The Institute for Theoretical Physics is directed by Dr. Aage Bohr, whose late father, Niels Bohr, was a Nobel Prize winner and a wartime researcher at Los Alamos.

Norman Wilson of K-1 has been named to the executive committee of the newly-formed New Mexico Section of the American Vacuum Society. The AVS, one of the fastest growing technical groups in the nation, chartered the New Mexico unit to serve the more than 150 high vacuum researchers in Los Alamos and Albuquerque and an anticipated increase in that number from the burgeoning aerospace activity in the El Paso-White Sands area.

The LASL News, The Atom's predecessor as the Laboratory's employee magazine, last month was awarded a certificate of merit by the 21-member Association of Nuclear Editors. Based on publication during 1963, the certificate cited the LASL News "in recognition of the publication which best fulfills the purpose of the ANE." Awards also went to NTS News, published by Reynolds Electrical & Engineering Co., and to The Bendix News, The Bendix Corporation—Kansas City Division. Presentations were made at the organization's annual meeting, June 12, in New York City.



K. F. Hertford

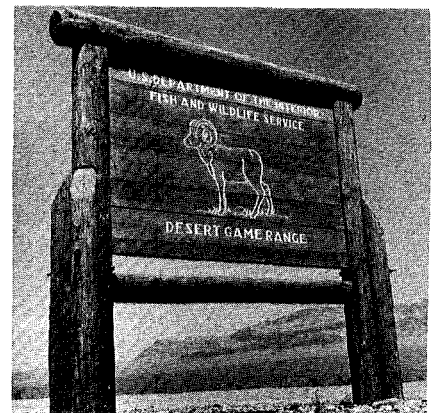
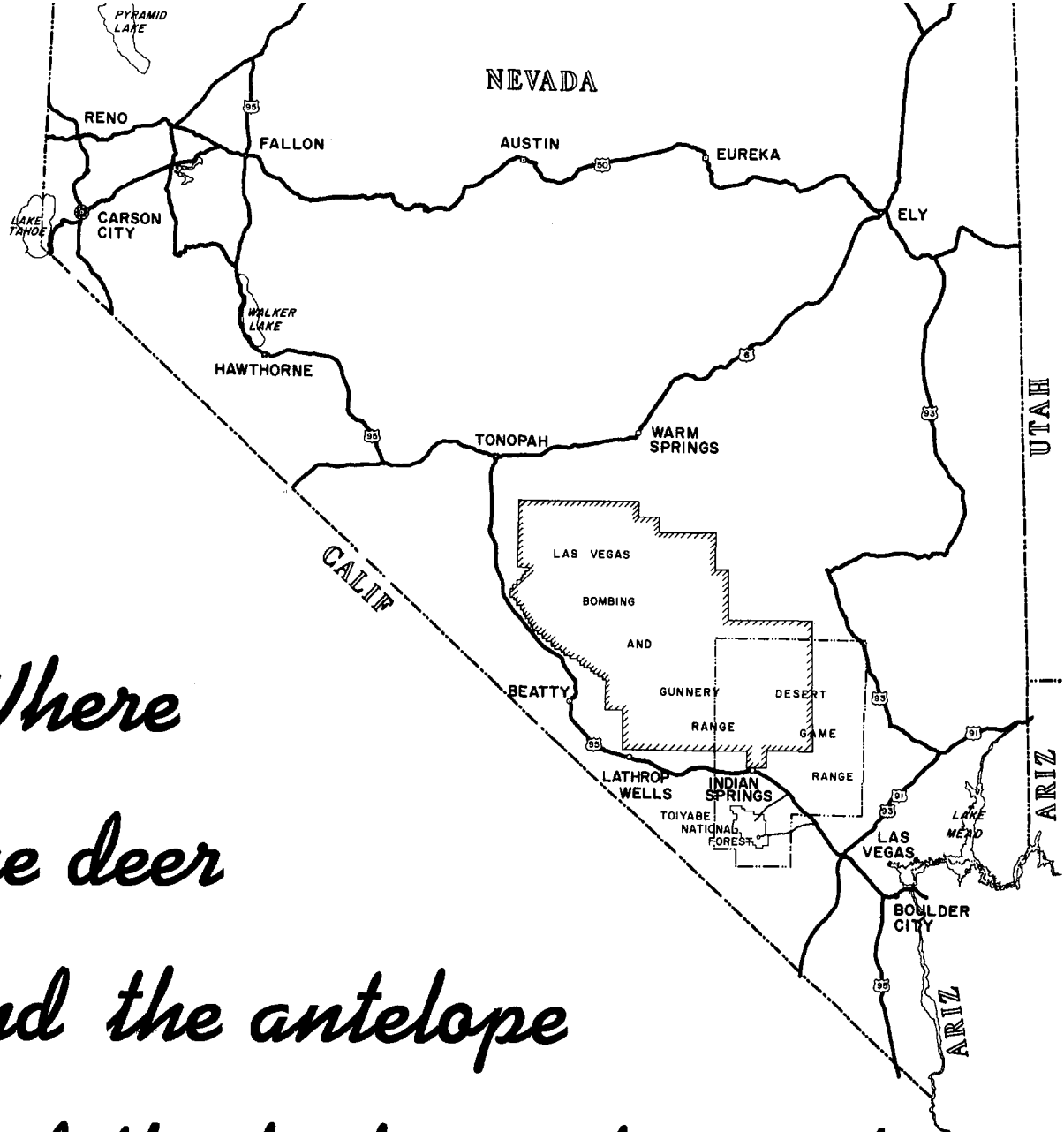


Lawrence P. Gise

Kenner F. Hertford, manager of the AEC's Albuquerque Operations Office since 1955, is retiring at the end of July. He will be succeeded by Lawrence P. Gise, who has been deputy manager at ALOO since 1961. Hertford, a graduate of West Point and Cornell University, is a retired Army major general. He served as a military advisor during the San Francisco Conference which established the United Nations in 1945, directed the nuclear tests in Nevada and the Pacific in 1952, and was chief of research and development for the Office of the Chief of Staff of the Army when he retired to head ALOO. Gise was a Navy lieutenant commander during World War II and was with the AEC's Division of Military Application and the Advanced Research Projects Agency of the Department of Defense before joining AEC in Albuquerque.

Roger E. Bordenkircher has been named 1964 Fund Drive Chairman by the Los Alamos Community Chest Board of Directors, according to Chest President Floyd B. Baker. A graduate of the University of Oklahoma, Bordenkircher has held a number of supervisory positions prior to his being named labor relations supervisor for the Zia Company in February of this year.

*Where
the deer
and the antelope
and the bighorn sheep play...*



Nevada's Desert Game Range, the largest U.S. game refuge, is bigger than the entire state of Rhode Island.

Nearly 5,000 people commute daily between Las Vegas and Mercury, Nevada. Most of the 70 mile trip is across the largest national wildlife refuge in the continental United States.

The refuge, known as the Desert Game Range, is administered by the U.S. Fish and Wildlife Service. It was established in 1936 for the management and study of the Nelson or desert bighorn sheep—an animal which was rapidly becoming extinct. At the time of establishment, the range had a population of about 300 bighorn sheep; today there are some 1,500 on the range. Another 1,000 have wandered off the refuge as far as Death Valley to the west, the Colorado River to the east, Ely, Nevada, to the north, and the tip of Nevada to the south.

The Desert Game Range covers an area larger than the state of Rhode Island, comprising 2,000,100 acres, or more than 1,500 square miles. The southern boundary of the range is near Las Vegas. The refuge, bounded on the west by the Nye-Clark county line, includes six mountain ranges running generally north and south. Highway 95 runs between the Spring and Sheep ranges, the highest and most impressive mountains within the refuge. Charleston Peak in the Spring Range has an altitude of 11,910 feet, while Sheep Peak in the latter range reaches 9,762 feet.

The climate of the Charleston area is Alpine in nature, but it is in the Sheep Range where water is scarce that most of the bighorns live—some 1,000 at last count, according to Newell B. Morgan, Desert Game Range refuge manager.

The Nelson bighorn is smaller than its rocky Mountain cousin, but has a wider horn spread. The animal is well adapted to its desert environment and can live without water for extended periods. Desert bighorns have been native to the country since Pleistocene times. They played an important part in the economy of the Indians whose

hunts are preserved in numerous petroglyphs and pictographs throughout the Desert Game Range. They likewise provided meat for early prospectors and settlers who hunted and trapped the animals as year-around table fare, a practice which almost eradicated the animal.

Since 1954, the desert bighorn is once again being hunted. Last season 120 permits were issued in the entire state with about 30 per cent kill; only 15 were taken off the refuge. Persons living in Nevada for six months may apply for a resident hunting license. Roughly 120 bighorn sheep tags will be issued by Nevada during 1964, 80 of which will be for Clark county and 45 for the game range. A few non-resident tags are also issued. Applications for bighorn tags are generally available after the first of June, following which there is a

drawing. The hunt is scheduled for the latter part of November.

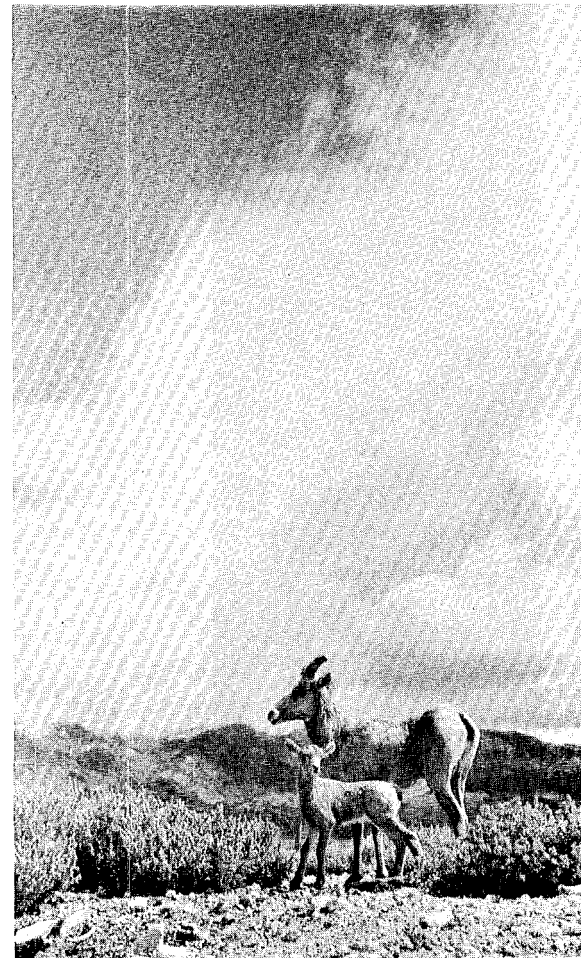
Hunting of bighorn sheep is part of game management practices which culls out the older bucks, thus keeping the herd within the carrying capacity of the range. Morgan explained that this keeps the herd from reaching a saturation point where starvation and disease suddenly and drastically reduce it.

Although management practices revolve largely around the bighorn sheep, other game is present on the refuge. Mule deer are found in all timbered areas, with the largest population in the Spring Range. Antelope and elk were introduced into the area in 1950 and 1933 respectively.

The Desert Game Range has attractions for those other than hunt-

continued on next page

A desert bighorn ewe and lamb are pictured at the base of the Sheep Range. These animals are a true sheep.



Desert Game Range . . .

Continued from preceding page

ers. The Corn Creek Field Station, 20 miles northwest of Las Vegas on U.S. 95 and then six miles north on dirt road, is an oasis the entire family can enjoy. Here there is a small but permanent herd of bighorns, and they'll mug the camera for the shutter-bug fans. On a pond at the station are Canada Geese, ducks, and cranes.

The Spring Mountain Range, across the valley from the field station, is best suited for family recreational purposes. Both the Forest Service and the Wildlife Service have recreational facilities in this area, including limited fishing. Overnight facilities are available, though campers will find they are roughing it.

The Red Rock area of the Spring Range, accessible by trail, is said to rival the scenic beauty of Bryce Canyon. Hidden Forest, where

there is a small family camp ground, has some yellow pines whose age approaches 500 years. This forest is not unique, but typical of many such small forests scattered in the back country of the Desert Game Range.

Four wheel drive vehicles are

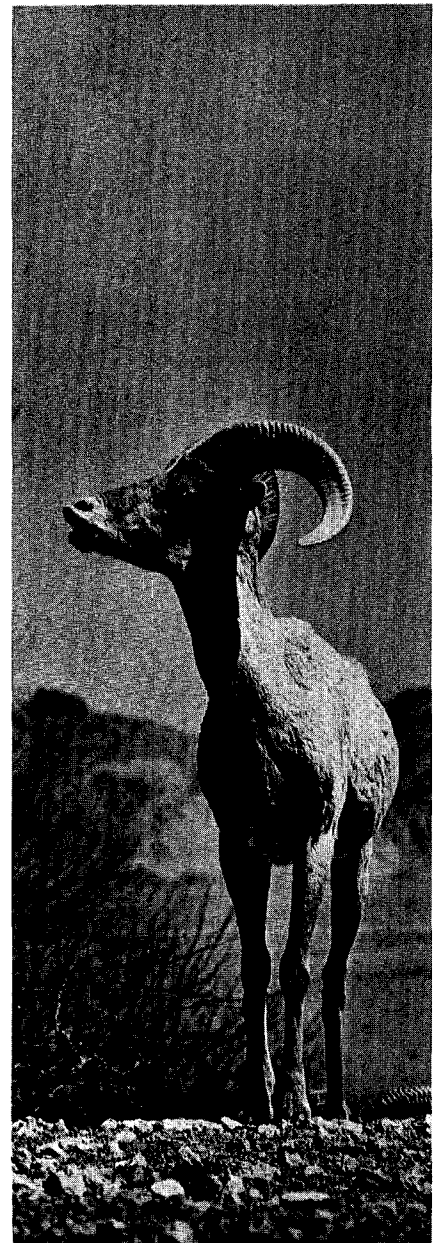


Many water fowl, like this Canada goose, find the pond at Corn Creek Field Station a good place to nest.

The Corn Creek Field Station, the center of activity for the U.S. Fish and Wildlife Service's Desert Game Range, is a real oasis in the desert.



suggested for those planning trips into the Sheep Range. An interesting circle drive is possible from Las Vegas to Corn Creek, between the Sheep mountains and Las Vegas Range to Highway 93, and return to Las Vegas. However, before making this trip it is best to check road conditions either at Wildlife headquarters in Las Vegas, phone 878-9617, or with personnel at the Corn Creek Field Station.



One of the Desert Game Range's 1,500 bighorn sheep mugs the camera.

Analysis Confirms Kiwi Test Success

Disassembly and analysis of LASL's Kiwi-B4-D confirms that the nuclear rocket reactor core was not damaged during the full power test conducted at NRDS on May 13.

In commenting upon the test, Harold B. Finger, head of the joint AEC-NASA Space Nuclear Propulsion Office, said: "A major forward step has been taken in the milestone established by the Los Alamos Scientific Laboratory in its design, development, operation and analysis of the Kiwi-B4-D nuclear rocket experiment."

The only structural damage the Kiwi-B4-D suffered was a crack in a graphite slat at the reactor rim, which is regarded as minor in effect and importance. The disassembled fuel elements and certain other parts have been shipped back to Los Alamos where they are undergoing detailed destructive and non-destructive inspection tests.

The Kiwi-B4-D operated at close to full design power and temperature for approximately 100 seconds. While it was planned to operate the reactor longer, the duration of the test was not a critical feature. The reactor was shut down because the

nozzle sprang a leak, causing burning of insulation and painted surfaces exterior to the reactor.

The Kiwi-B4-D was the seventh in a series of reactors power tested by LASL in the Rover program--the nation's effort to develop a nuclear rocket for space travel.

The successful Kiwi-B4-D test climaxed an extensive LASL program of analytical and experimental laboratory work and cold-flow (unfueled) reactor testing to determine and eliminate vibrations which damaged the Kiwi-B4-A reactor core on November 30, 1962. The May 13 test demonstrates that the vibration problem has been eliminated.

Sen. Alan Bible (D-Nevada), in a newspaper interview following the May 13 test in Nevada, said he plans to push for a broadened program for the Los Alamos-based project. He added that he intends to ask Congress for more appropriations to keep the Rover program pushing forward.

Finger told members of the Aviation/Space Writers Association that "aerospace history will record May 13, 1964, as the day on which a nuclear rocket reactor was first tested

successfully at power and temperature to pave the way for the development and use in space flight of a new, advanced, efficient, high performance propulsion system--the nuclear rocket."

The chief of SNPO points out that much work is still needed to make a nuclear rocket propulsion system which will at least operate for full mission durations, and to design and develop them to higher powers. But he adds that the Kiwi-B4-D test is an important milestone in this country's program to develop nuclear rocket propulsion, and it serves as a firm base for the development work that is to follow. Finger said that the Kiwi-B4-D power run "provides good reason for confidence in the successful execution of the tests to be conducted this year and next, and provides a good basis for confidence in the availability of nuclear rockets when they will be required for the performance of advanced space missions."

LASL is already conducting initial experiments at NRDS for its next reactor power run--the Kiwi-B4-E,--which will be later this summer.

Two Worlds And a Dream

PORTRAIT OF AN OUTSTANDING YOUNG MAN

An Indian pueblo in which all able-bodied adults are working, earning a good living and competing on an equal basis with non-Indians.

This is the dream—and the hope—of James S. Hena, a Graphic Arts employee who, as governor of the Tesuque Pueblo, has launched a forward-looking series of economic and welfare improvement projects that he hopes will lead his people toward closer contact with present-day life.

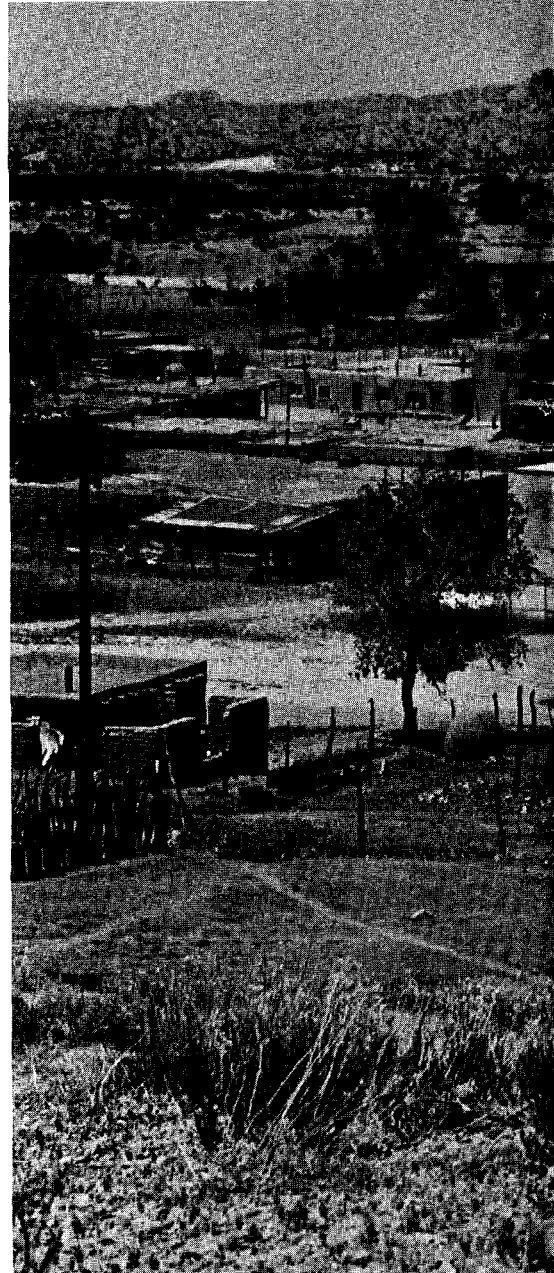
Achieving his ultimate dream, however, “will be a long, drawn-out process based on a program of education,” Hena says. “The people must be taught that in order to make a good living, they must learn how the white man thinks. Then they must stand shoulder to shoulder and compete in his world. This feeling that ‘we can’t make it’ must be discarded.”

Jim Hena knows whereof he speaks. He himself has “made it,” emerging from his withdrawn Indian environment to compete in the outside world with such success that he was named last spring

by the Junior Chamber of Commerce as one of New Mexico’s two Outstanding Young Men of 1963, and is listed in a who’s-who publication by the Outstanding Young Men of America. He also will be nominated by the Los Alamos Jaycees for the Ten Outstanding Young Men of the United States award for 1964.

Jim’s personal transition began, as it did for much of the Indian population, during World War II when he took a summer job at the tender age of 14 in the way-out, very-20th-Century world of Los Alamos as a waiter in the PX. After his graduation from Santa Fe high school he spent 33 months in the Army Ordinance Corps, serving in Europe for more than two years. He worked for a manufacturing concern in Santa Fe, travelling throughout the South before joining LASL’s Graphic Arts group as a lithograph operator in 1955.

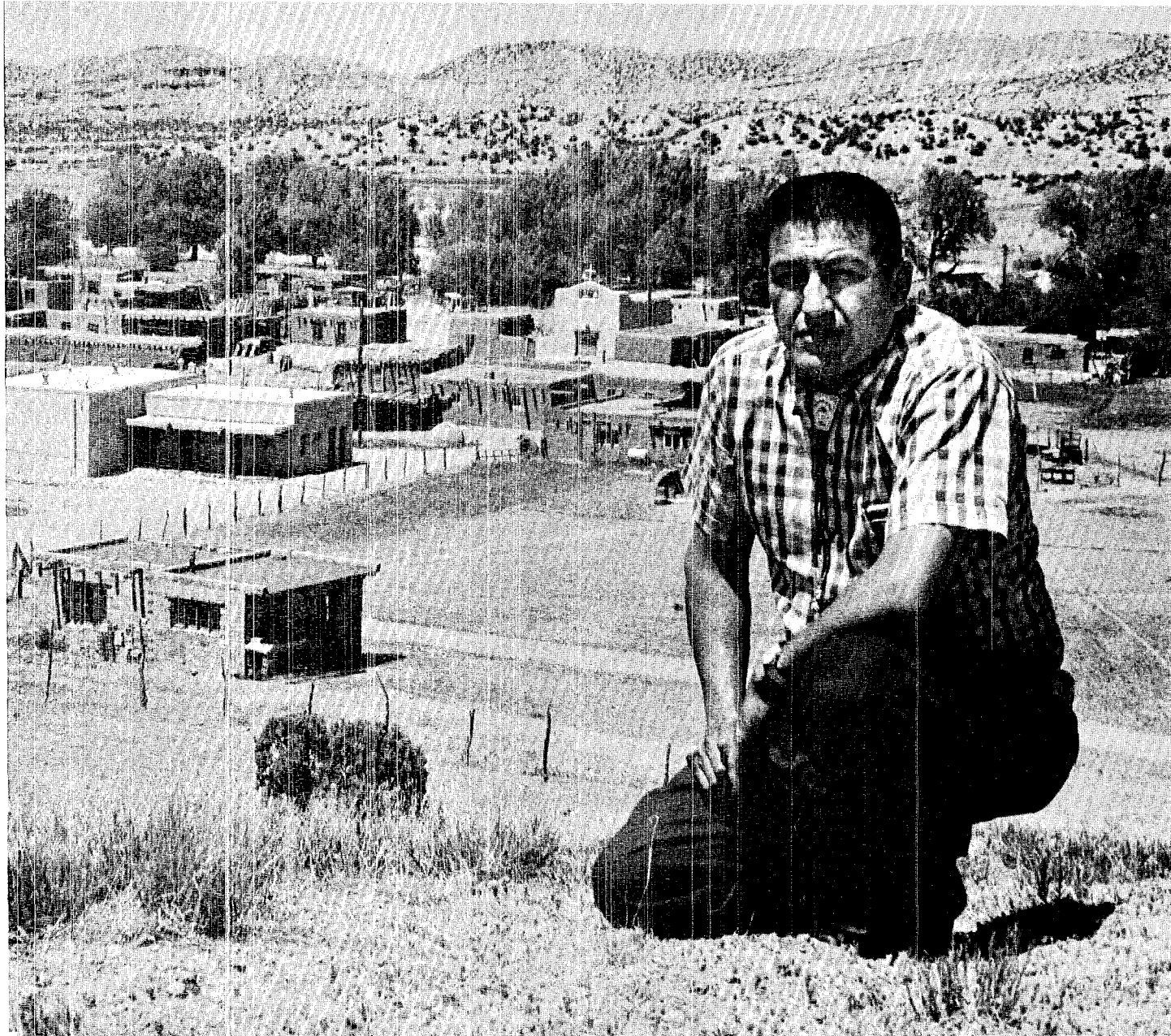
The Henas, with their son and four daughters ranging in age from 8 downward, live in a home Jim built himself in the Pueblo, about ten miles north of Santa Fe.



Since his discharge from the Army, Hena has been attending night courses at St. Michael’s College in Santa Fe, working toward his BA degree. Although he hopes eventually to finish the work, his education has been temporarily interrupted by financial pressure and the demands of his office.

Originally working for his teaching credentials, Hena’s interests have shifted to psychology and counselling.

“Everything I’ve learned so far in psychology has been of great value in my work in the Pueblo,” he said. “Understanding how



Tesuque Pueblo and its young governor, James S. Hena

people think helps in communication, especially with people who are uneducated."

In 1963 after three years as lieutenant governor, Hena was appointed governor at the age of 33, becoming one of the youngest chief executives in Pueblo history.

Now in his second term, Hena heads the Pueblo's Farming Enterprise Committee, the Summer Home Program Committee to lease land in the foothills for cabin sites, and the Self-Help Housing Committee to provide better housing for the Pueblo.

He initiated a construction pro-

ject that resulted in a \$25,000 community building providing administrative offices, council chambers, a recreation hall and kitchenette, and detention rooms. He has encouraged money-raising events, such as the big annual dinner and Indian dance affair, open to tourists, to provide money for the college scholarship fund of the Southwestern Association for Indian

Affairs and to buy recreational equipment for the youth of the pueblo.

Hena's efforts to establish a library have produced promises of lots of books and he now hopes to be able to construct another building to house them.

Large tracts of land have been fenced to improve grazing condi-

continued on next page

JIM HENA . . .

continued from preceding page

tions. New roads, built at Hena's insistence, have provided safe access to the woodlands and clay pit in

the foothills across Highway 64 from the pueblo. The clay pit, a source of material for Tesuque potters for centuries, has been transformed by bulldozers from a crumbling cave to an open pit to

eliminate the hazards of cave-ins.

Hena has established a police force for the pueblo and provided members with insurance policies, the first such community-financed coverage in the country.

Hena combats the problem of alcoholism by continuing a program of education and assistance for those in need and has served on a panel on Alcoholism for Indian Tribes in New Mexico and Arizona.

Communication, Hena has found, is the major barrier to improving Indian life, both in the outside world and within the pueblo itself.

"English is a foreign language to the Indians," he pointed out. The ancient Tewa tongue is always used within the pueblo and Tesuque babies are taught Tewa from birth. Children in primary grades are taught some English in the pueblo day school but when they go on to Santa Fe public schools, as nearly all of them now do, they have a definite handicap, Hena said.

"When I went into the Army, I was still speaking broken English and I was ashamed of it," Hena said. "Then I found there were fellows who had been born to the English language who couldn't speak much better than I did so I decided it didn't have to be a problem." He was right. He now is able to express himself in English with better than average skill.

But Hena still finds it difficult to communicate to his people, particularly the older, uneducated ones, and make them understand the changing way of life. "So often there just aren't any words in Tewa to explain modern terms." This problem is compounded by the fact that, although all younger members of the pueblo learn English, the older generation has a

Two canes—one presented to the pueblo more than 100 years ago by President Lincoln—are Hena's symbols of authority as Governor. Here he shows them to his wife, Sophie, and their five children, Louis, Charlotte, Diane, Thelma and Barbara.



At work in the Laboratory's Graphic Arts group, Hena, head pressman of the lithographic section, confers with Dorothy Daily.



Hena discusses plans for the development of Tesuque's Aspen Ranch area with investment representative Richard Rogers.



smattering of Spanish as a second language.

Even so, Jim Hena is making his people understand, and gradually his pueblo is swinging into step with the modern world. As it does so, Hena sees no conflict with the age-old Indian culture.

"The change is only in our economy, in the matter of making a living."

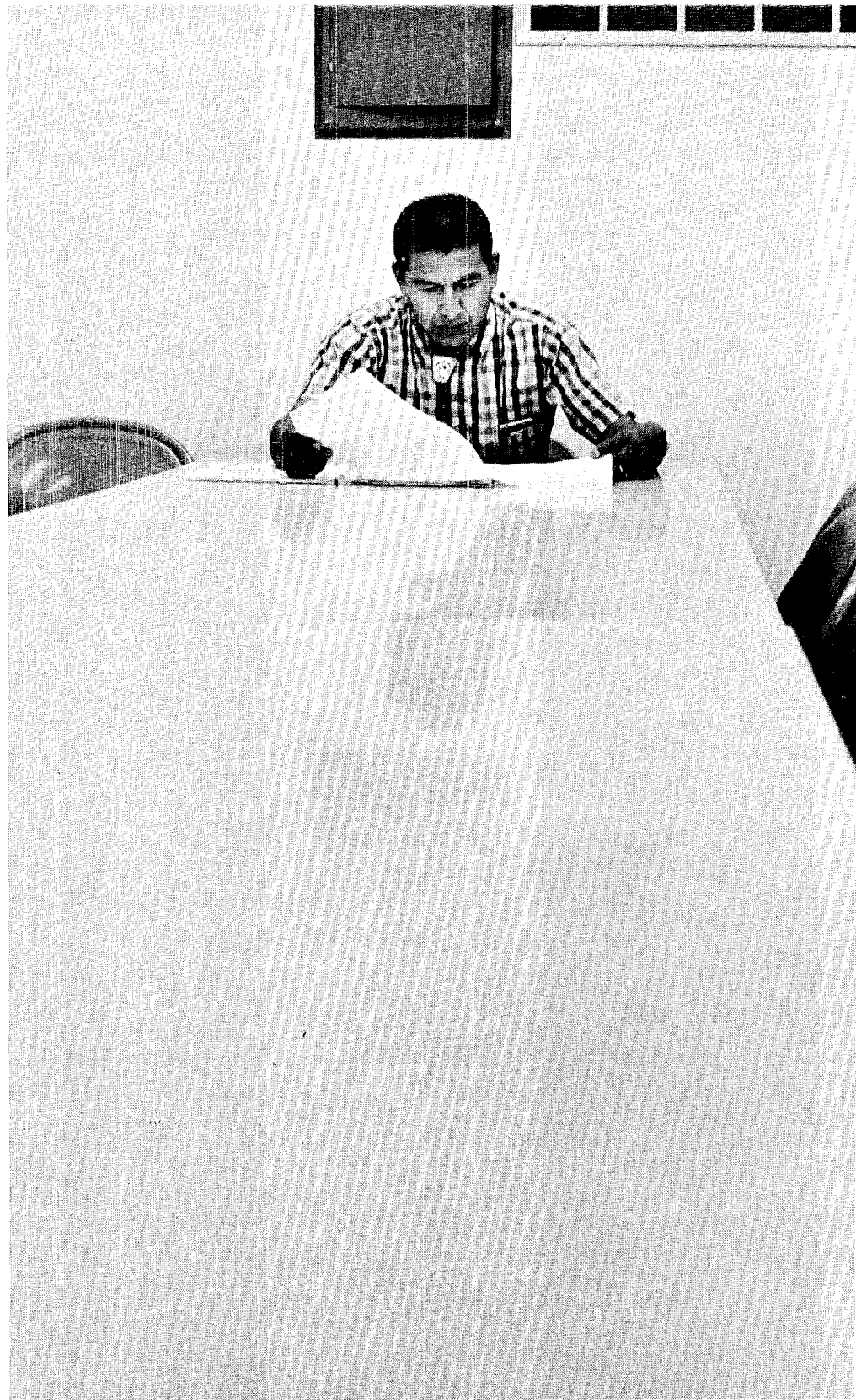
Since the war, when both men and women of the pueblo were able to go out and get jobs, the pueblo has been slipping away from its agricultural economy. Now, Hena says, because of the limited education and the difficulties with English, "we're mainly what you might call pick and shovel people." But it needn't—and won't always—be so, Hena maintains. With increasing education—and more confidence—the Indians will get better jobs and make more money.

But that won't change their attitudes, Hena says, because the basic Indian philosophy remains the same, he explained.

The non-Indian tries to make more money so he can buy things to make him just a little bit better than his neighbor. The Indian, on the other hand, earns money and buys a car because he needs transportation to his work or a television because he thinks it will give his family entertainment and information. There is not the competition you find in the white man's world, he said.

Discussing the Indian and civil rights question, Hena says there is a certain amount of discrimination against the Indian but not enough to make much difference. Any discrimination that may exist, he feels, comes from the non-Indian's mistaken impression that the Indian is riding high on federal money at the taxpayer's expense.

"This is definitely not true," he emphasized. Except for occasional back payments for land, the pueblos get no money from the government. "All the money we have is what we make ourselves," he said. "I wish people would understand that."



Alone in Tesuque's council chambers, Hena goes over some pueblo business.

Obstinate Metals Take Note: The Big

How pure research in a far-out area of science can lead to solution of a knotty industrial problem is being demonstrated by a Los Alamos Scientific Laboratory metallurgist and his assistant, borrowing a principle and some equipment from Project Sherwood.

Donald J. Sandstrom, metallurgist, and Charles L. Terrell, technician, both with LASL's Materials Technology Group (CMB-6), are producing long tubes from powdered refractory metals and from powdered cermets (mixtures of ceramic and metal powders), using a magnetic "pinch" device called Columbus. Columbus was used in some of LASL's earlier attempts to

produce a controlled thermonuclear reaction. The idea for producing the tubes came from George Erickson of LASL's Project Rover Division, and Ed L. Kemp, a Sherwood group leader (P-16), helped Sandstrom and Terrell set up the equipment.

The Columbus-type device is a new and different tool to form refractory metals, particularly tungsten and molybdenum, which are difficult to form by conventional methods. It forms tungsten and tungsten alloy tubes cheaper, faster, and with greater uniformity than has been possible by any other method. In fact, no other method has been able to turn out tungsten

tubes with any degree of homogeneity, while the CMB-6 device can make them to almost any length, and all the same.

Refractory metals, such as molybdenum and tungsten, are so-called because they are difficult to handle. They do not fuse or melt readily, and are very obstinate about being formed into useful industrial shapes. As powders, their most common form, they have to be squeezed or drawn into shape, instead of being melted and poured into molds as more malleable materials can be. Producing a big enough squeeze down a long column is the chief difficulty in trying to make uniform, homogeneous tubes out of the material.

That's where Sherwood comes in. LASL has developed a number of ingenious devices to put the big squeeze on various substances, using fast-rising magnetic fields of enormous strength. To produce such fields, LASL has developed one of the world's largest capacitor banks to furnish the millions of amperes of current required.

The Columbus powder metallurgy compaction device, while small by present day standards, can exert



Following a principle borrowed from a Project Sherwood device, the tubes at left and center were formed from metal powder compacted by a magnetic squeeze within a copper tube like the one at right.

Squeeze is On

magnetic pressures of 25 tons or more per square inch, for the few millionths of a second necessary to do the work.

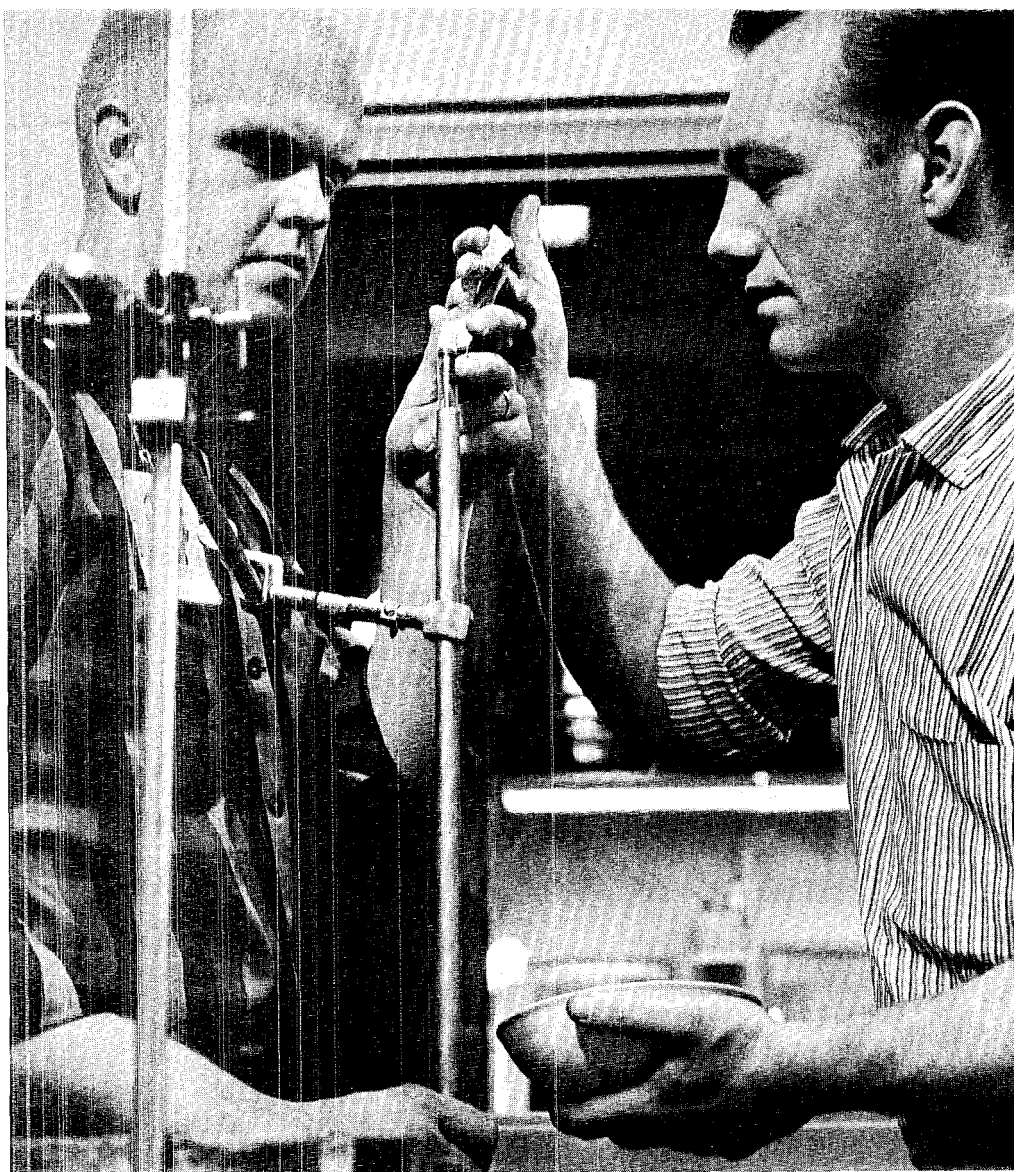
Sandstrom and Terrell put a steel mandrel (shaped to determine the inside diameter of the tube to be formed) inside a jacket of thin-walled copper, and fill the space between with metal or cermet powder. They then attach one side of the Sherwood-type capacitor bank they have built to an outside conductor, and the other side to the copper jacket, forming an electrical short circuit.

When the switch is thrown, a million amperes of current at 20,000 volts surges through the circuit, building up a tremendous magnetic field for a few microseconds. The duration is so short that the circuit does not heat up very much.

The effect of flowing current through a conductor is to produce a magnetic field—the higher the current, the stronger the field. The magnetic field exerts pressure along and around the conductor, squeezing it. If the conductor is a bundle of wires, or a conductive gas, it will be pinched noticeably. This is the well-known pinch effect which is the basis of many Sherwood experiments.

In the case of the CMB-6 experiment, it is a copper jacket that is pinched, or squeezed, and within it the metal powder is compacted. The powder is squeezed against the steel mandrel, thus forming a tube of densely compacted powder.

The mandrel then can be slipped out of the tube. The "green" tube, strong enough to be handled, is then fired or presintered at 900



Donald J. Sandstrom (left) and Charles L. Terrell pour some tungsten powder prior to forming a tube on a Project Sherwood device.

degrees centigrade in a hydrogen atmosphere to harden and toughen it. The copper sleeve is then etched off in a nitric acid bath, and the tube is given a final sinter at 1,750 degrees in hydrogen to obtain a final density almost equal to that of the pure metal. Polyethylene sleeves used to keep the powder from sticking to the mandrel or to the copper jacket are burned away during the firing process.

The same degree and extent of compaction can be reproduced time and again by using the same

amount of current, making it possible to turn out identical sections of tubing.

Sandstrom and Terrell are continuing to investigate their tube-making method, particularly by varying the particle size of the powders.

Tubing made from refractory materials is used extensively in rocket work, as fuel elements in nuclear reactors, and elsewhere that materials capable of withstanding very high temperatures are required.

Data From Vela

LASL INSTRUMENTS ABOARD TWIN "WATCHDOG"
SATELLITES HAVE DETECTED CLOUDS OF HIGH SPEED
ELECTRONS BEYOND THE VAN ALLEN RADIATION BELTS

Clouds of high speed electrons, far in space, have been discovered by the orbiting Vela Hotel satellites and may be of great importance in mapping the earth's magnetic fields.

The clouds, with particle energies greater than 60 kilovolts, appear to be in a pancake-shaped area, perhaps 10 thousand miles thick and 35 thousand miles across. They occur between 60 thousand and 70 thousand miles out from the "dark side" of the earth, that is, the side opposite the sun, and centered about an extended sun-earth line.

Information on the charged particle, or plasma, clouds was gathered from the sensing instruments designed and built by LASL physicists for the nuclear burst detection program. The instruments have proven to be excellent collectors of pure scientific data as well as watchdogs against nuclear bomb detonations.

The instruments are on two satellites launched last October and are in almost-circular orbits.

The first compiled and unclassified report on Vela data was given at the annual international COSPAR (Committee on Space Re-

search) Symposium in May in Florence, Italy, by Sid Singer and Jerry Conner, both of P-4. Singer discussed the plasma observations, Conner told of measuring X-ray emission from the sun.

On the basis of present data, Singer said, radiation intensity of the electron clouds is considerably less than that from the much-closer-in Van Allen Radiation Belts. For this reason the "Vela clouds" are not regarded as a hazard to future space travelers, he said.

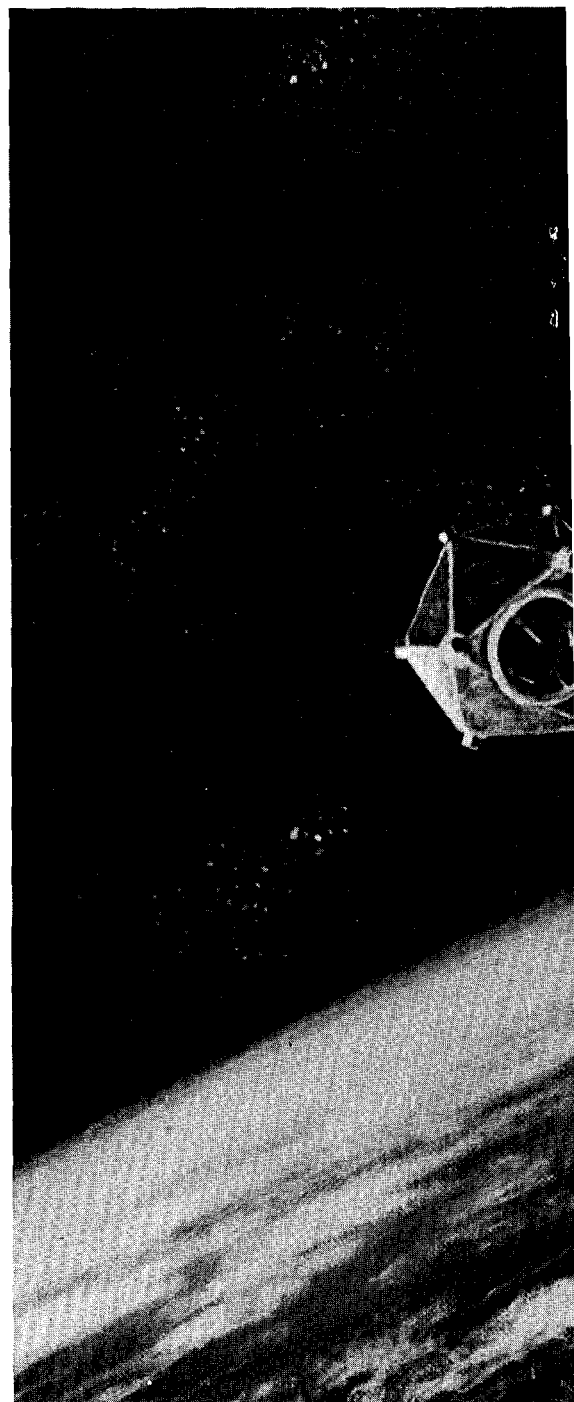
The Van Allen Belts are comprised of electrons and protons with energies in the millions of electron volts and envelop a considerable portion of the earth at distances from about a thousand miles to nearly 30 thousand miles.

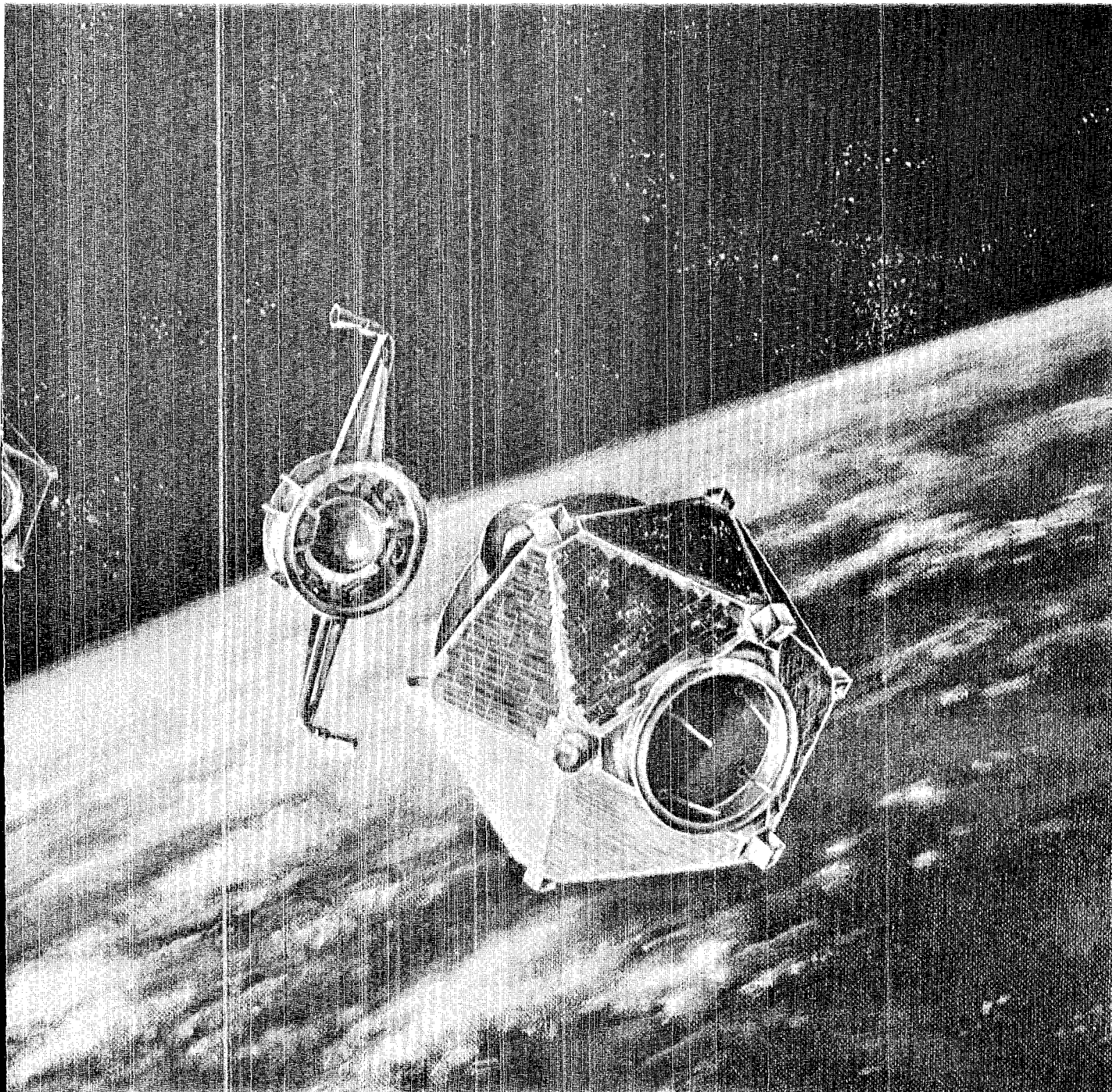
The clouds were first noted during the first three weeks of operation of the Vela satellites, in late October and early November 1963. As the seasonal swing of the earth shifted the plane of the orbits, the readings faded. By late April the orbit plane had moved 180 degrees and the spacecraft sensors again were reporting the radiation.

The plasma discovery may yield useful information toward an understanding of the formation of

aurora. There also has been an interesting correlation between disturbances within the plasma and simultaneous magnetic storms on the surface of the earth, Singer said.

The extreme distance of the plasma indicates it is near the boundary between the earth's mag-





Artist's conception, by Space Technology Laboratories, Inc., shows Vela satellites on journey into earth orbit.

netic field and the interplanetary magnetic field, he added.

The satellites, which are orbiting some 120 degrees apart, have also performed excellently as solar observatories, Conner told the COSPAR group. Their distant orbits make possible long uninter-

rupted periods of counting X-ray activity that originates in the sun.

Analysis of data correlates with solar flares reported by earth-bound optical observatories, but also indicates that the sun may give off X radiation without otherwise obviously noted disturbances, and

that radiation intensities sometimes vary for solar flares of the same class, Conner said.

In addition to Singer and Conner, the COSPAR papers were prepared by W. D. Evans, Michael Montgomery and Eldon E. Stogsdill.

Spectacular White Rock Canyon

History is in the making along the shores of Los Alamos County's eastern water border, in the deep, rough, lonely and spectacular trench known as White Rock Canyon.

Here the ancient Rio Grande has slashed its tortured course through the pumice and basaltic slopes of the Jemez Mountains. The canyon is a place of savage beauty, changing its moods with every change in the light, breathtaking when viewed from above at any of many vantage points.

Among other things geographic, White Rock gorge is the eastern boundary of Los Alamos County, a little piece of Santa Fe county's western edge, and about 10 miles of Bandelier National Monument's present boundary. One end of the gorge is in the lands of San Ildefonso Pueblo, the other in those of the Cochiti Pueblo. The vast reaches of the Caja del Rio and La Majada land grants, administered by the U.S. Department of Agriculture save for a few private holdings, line nearly all the eastern shore.

Except for occasional dare-devil rubber boat enthusiasts who ride its whitecaps during spring runoff, the canyon is rarely visited. It is inaccessible other than at two or three places in all its serpentine 25 miles from Otowi Bridge to the Cochiti diversion dam. It has always been easier to go through than into or across.

The closest point of access by automobile (or anything else on wheels) is at the old Buckman townsite in Cañada Ancha, 18 miles northwest of Santa Fe, where a wide, sandy arroyo sweeps gently down to the river through a break in the eastern wall. The Buckman road to Santa Fe comes within a hundred yards of the river here, at the point where the narrow gauge railroad from Santa Fe came out of the hills a quarter of a century ago.

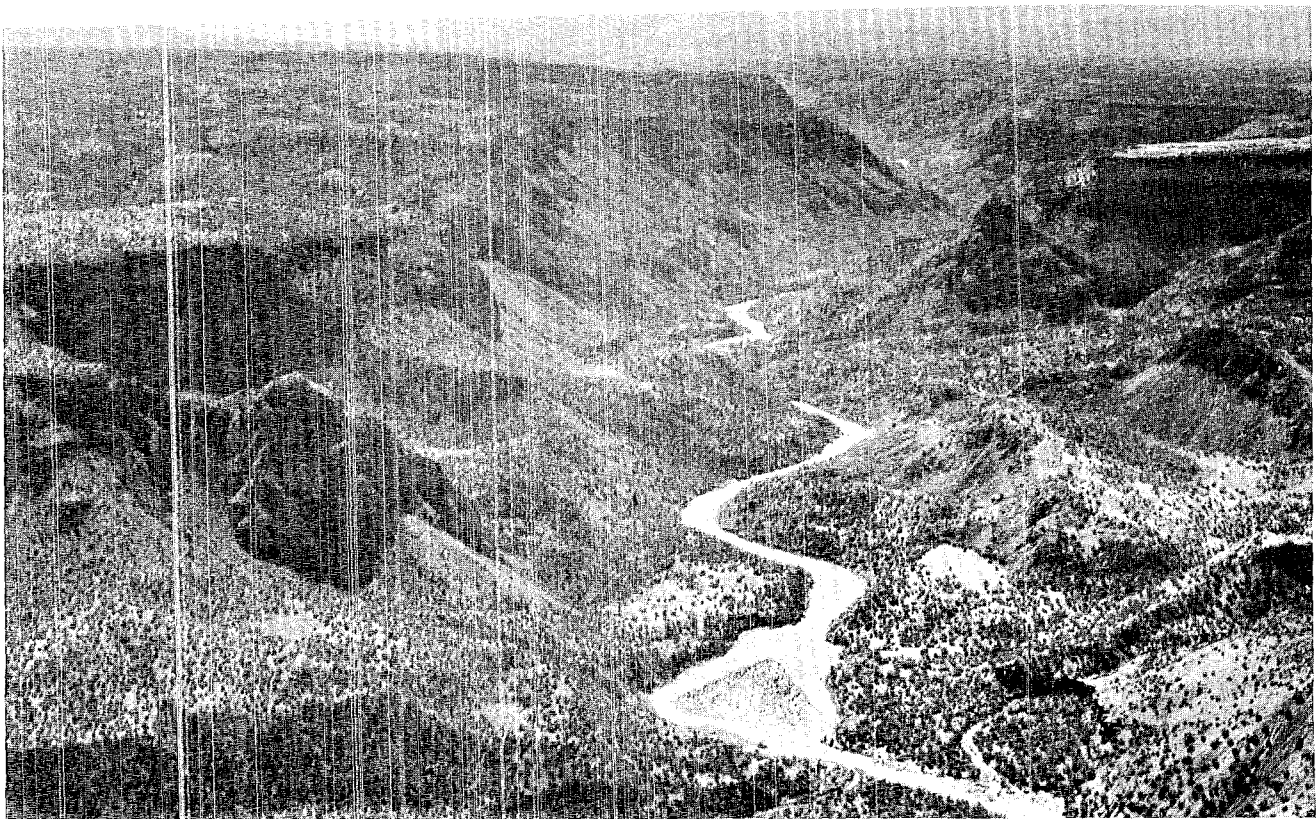
Opposite the Cañada, an old wagon trail later used by trucks and jeeps climbs the western wall close to the new residential community of White Rock. There is a good trail to the river about halfway down the gorge, where Frijoles Creek enters, and another one a few miles farther down at the mouth of Capulin Creek. Both trails are part of the Bandelier National Monument back country trail system, connecting with monument headquarters 10 miles or so to the north.

There are three other more or less established trails—dim, rocky and hard to find. One zig-zags down the tumbled boulders off the White Rock rim, another follows an equally rough route down just below Pajarito Canyon, and there is still another way down at Water Canyon. All three are good for goats and hard on shoes, but actually quite safe if you watch your step. Their origin is unknown, although they show signs of hand labor. They appear to be used principally by cattle and wild burros, but the presence of petroglyphs at some points suggests more ancient history.

At the southern end of the canyon, where it widens out into the plain above Albuquerque at the foot of the Bajada escarpment, a highway bridge crosses the river to Cochiti. Just above the bridge a low dam diverts water into the Cochiti ditch system. This is the end of the line for most boat trips.

A 5½-mile-long high dam is being designed to extend across the river a little way south of the present bridge and dam. This huge earthen structure is to be called Cochiti Dam. It will create a reservoir that when full will extend all the way to Buckman, near the north end of the canyon.

When the dam is completed, perhaps about 1970, it



will quickly change the entire aspect of White Rock Canyon. The gorge will no longer be isolated at all. It will be easily accessible to anyone with a boat—any kind of boat. All its hidden nooks and crannies, its surprising springs and Indian petroglyphs will be gazed upon and photographed—those that are not buried by the lake.

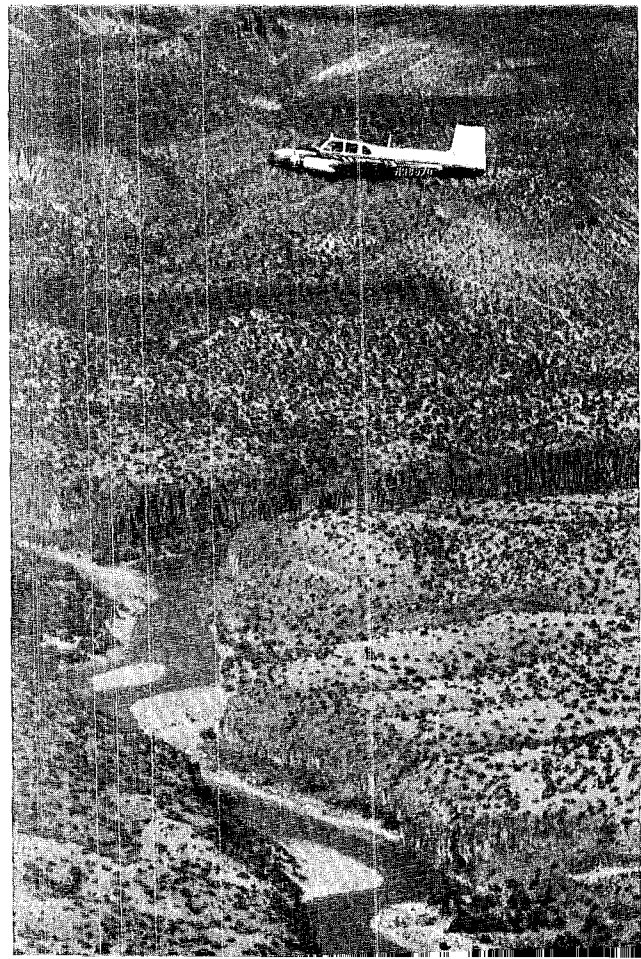
Even before the lake is formed, however, White Rock Canyon will be showing another radical change. There will be people living on its rim again, not the original prehistoric Indians in rock and brush shelters, but scientists and their families from Los Alamos.

Already the housing development at White Rock, nearly opposite Cañada Ancha, and Buckman, is creeping toward the rim of the gorge, 900 feet straight up the western escarpment. Just south of White Rock, another development of a different kind is moving along. Here on a portion of the Pajarito Plateau called Pajarito Acres some 150 families are about to start developing their own three-to-five-acre ranch home sites, some of which overlook the canyon. By the time the lake arrives, it should be possible to glimpse roof tops from the river.

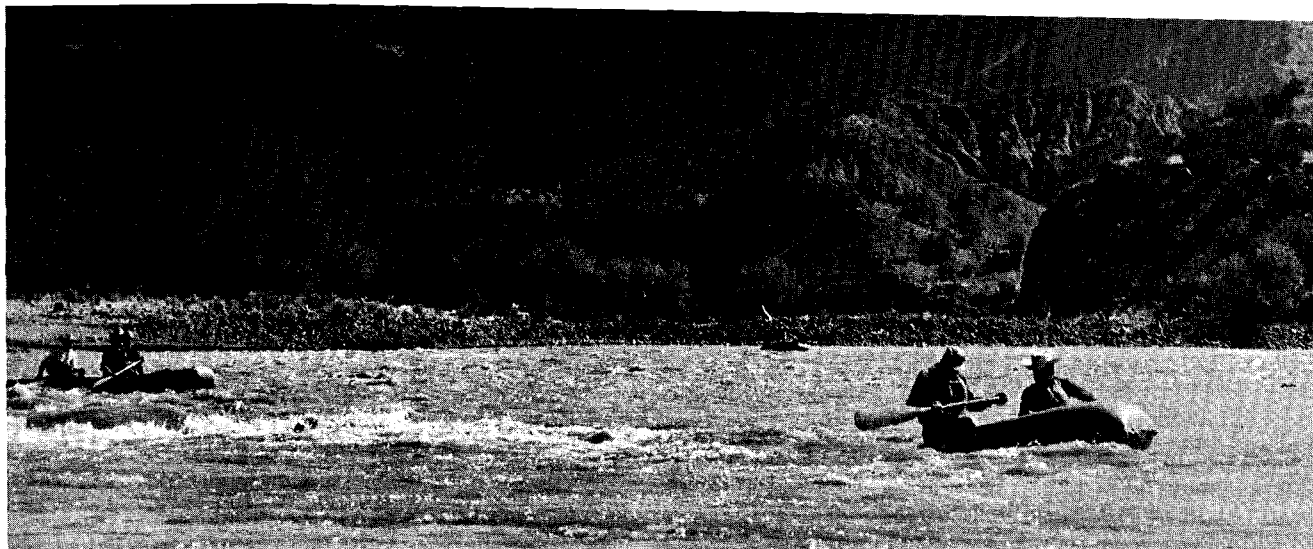
There is still another housing development in sight, although it may not literally be seen from the river because of the terrain. This is the area called Buckman Hills, along the eastern and southern approaches to Buckman Mesa, a little way east and north of the Buckman townsite. Here a determined little band of Los Alamos workers has bought small

From the air, the deep and rocky gorge of the Rio Grande in White Rock canyon is a panorama of twisting white water through a landscape of red, green and tan.

Carco flies the river at times, giving the passengers a thrilling view of some of the canyon.



continued on next page



The 900-foot cliffs of White Rock canyon loom high and forbidding above the 2-man rubber rafts of Explorer Post 20, running the Rio Grande at high water.

White Rock Canyon . . .

continued from preceding page

tracts of homesite land from the government. They have been plagued by road and right-of-way problems. Their original intention was to reach the area over the old Buckman road which runs down the eastern side of Buckman Mesa from State Highway 4 just east of Otowi Bridge. The trouble is, the last couple of miles of road goes through the San Ildefonso Indian reservation, and the Indians so far have refused a right-of-way.

An alternative plan calls for a road on the old Denver and Rio Grande railroad route along the river, which the Buckman Hills people are trying to get Santa Fe County to build, so far with limited success. There is a matter of funds. The Los Alamos group is doing its own surveying of the route in a last-ditch effort to get the project going.

As matters now stand, Buckman Hills can be reached by auto only by going the long way around through Santa Fe, a distance of 58 miles from Los Alamos. This is a pretty frustrating experience when you can stand on the hill and see the buildings of Los Alamos less than 10 miles away, and there is a main highway to and from work practically at your door.

Probably no one has seen more of White Rock Canyon than the members of Los Alamos Explorer Scout Post 20, who have run the river route six or eight times in rubber rafts as training for more difficult waters. Of course, they go through so fast they do not get a chance to see much of the scenery, as they always make the trip at high water.

Downstream beyond the canyon the river is likely to live up to its legendary name as the "dustiest river

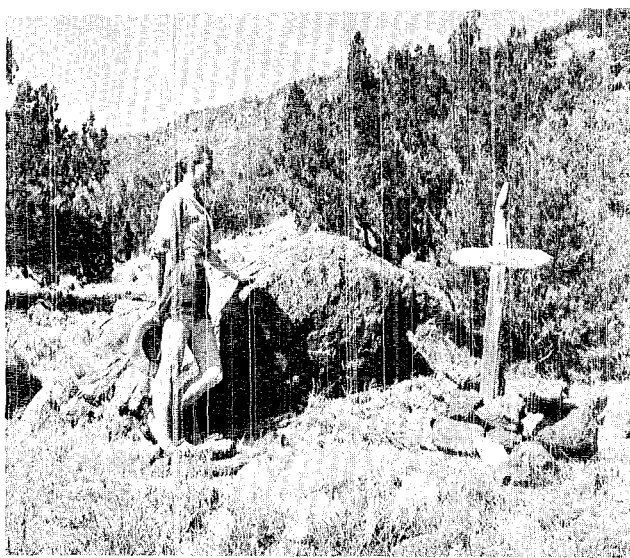
in the West," as it is usually "too thin to plow and too thick to drink." But in the canyon, where the walls are only a hundred yards apart in some places, the river can on occasion become real white water. Here it exemplifies its Spanish name of "Rio Bravo del Norte," the wild and fierce river of the north.

White Rock gorge has been run by people in rowboats, canoes, kyaks, even motor boats, although rubber rafts are by far the favorite means of locomotion. One man even made it upstream, at high water in May, 1960, in a three stage turbine jet boat drawing only three inches of water. Many other attempts to make the trip downstream in power boats have ended in disaster, although now and then one gets through. At low water, the trip is a long wet walk, with a few bad rapids most pilots prefer to go around.

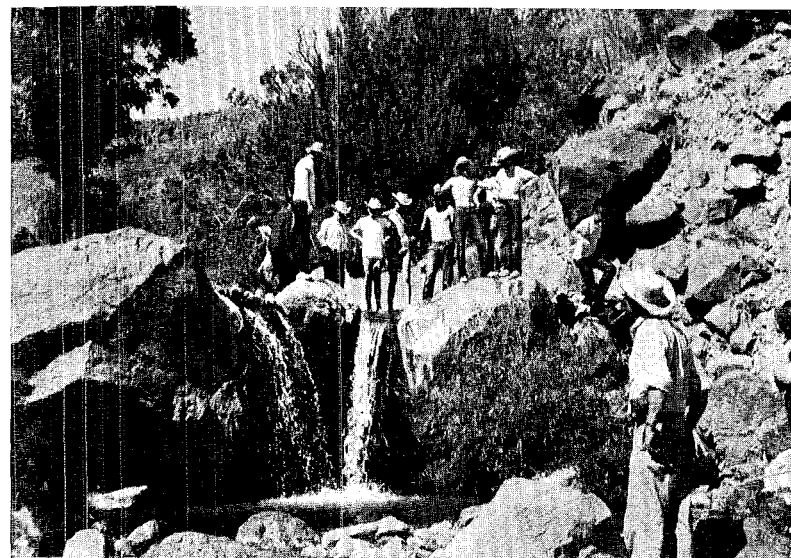
The river is relatively steep, as long rivers go. It drops an average of 10.3 feet per mile. At Ancho Canyon, the steepest section and the worst rapids, the drop is 20 feet per mile.

There are other rapids, starting with a long stretch at the beginning of the route just below Otowi Bridge, another set at Buckman $3\frac{1}{2}$ miles down, and others at Pajarito Canyon, Water Canyon (where there is a large island in the river), and at Capulin and Sanchez Canyons just above Cochiti.

At Pajarito Canyon, also, there are some points of interest: a clear running spring that tumbles into the river in a miniature waterfall, and the lonely grave of a shepherd on a sandbar, marked with a crude wooden cross. The sand beach below the spring is a favorite resting spot for river runners who welcome the spring as the only potable fresh water to be had on the route. There are some other springs along the way, but they are not reliable, and often are inaccessible from the river.



Pat Fretwell views the crude wooden cross marking the grave of some unknown sheepherder in White Rock canyon, near Pajarito spring.



The spring at Pajarito creek is a refreshing spot for river runners. Here a group of Scouts from Explorer Post 20 of Los Alamos stop for a dip.

For 54 years, the scenic narrow gauge railroad called the Chili Line ran along a three-mile stretch of White Rock Canyon, from Buckman to Otowi. It was part of the 125-mile, all-day run from Santa Fe to Antonito, Colorado, and thence to other points, originally conceived as a bold scheme to connect Denver and Mexico City by rail. It never got any farther than Santa Fe. But for more than half a century it hauled chili peppers (hence its name), timber, produce, and piñon nuts. Indians rode free in the early days. Along the way the train crew delivered the mail, newspapers, freight, and even babies.

The train stopped at Buckman, named for an old-time sawmill operator who loaded logs there, to take on water and coal. There was a watering station also at Otowi Bridge, where the abutments of the railroad crossing are still visible just downstream from the old highway bridge. The water tanks at both stops were filled from artesian springs which are still running.

During the heyday of the railroad, tourists rode the train to Buckman, and there boarded a wagon which crossed the Rio on a bridge when there was one, or forded it when there wasn't. From the Rio, the wagon road wound up the cliffs to the present site of White Rock, then took off through the woods to Bandelier National Monument and the Frey's dude ranch in Frijoles Canyon. Timber came down from the Jemez forests to Buckman's mill by the same route.

A little bit of the river, at the mouth of Frijoles Creek, sees more people every year than any other section between the bridges. Hundreds out of the 100,000 visitors to Bandelier National Monument each year walk the pleasant mile-and-a-half trail to the Rio Grande, stopping to admire the falls en

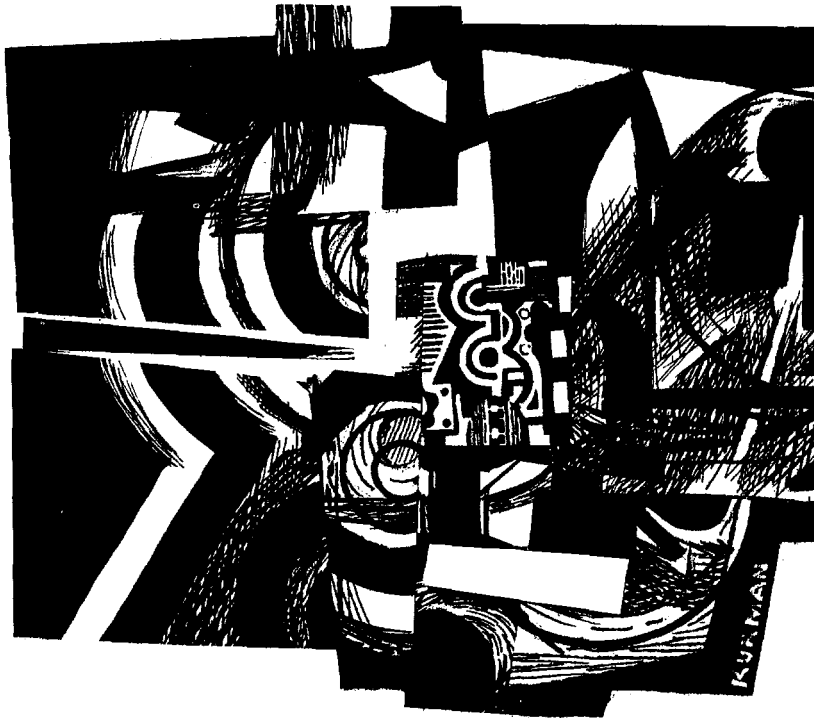
route. A very few make the long hike downstream to Capulin Canyon, Painted Cave, the Stone Lions and the climb over the mesas to the starting place.

A few hundred yards downstream from where the Frijoles reaches the river—when it does—a bubbling spring issues from a hole in a rock to run on down through a patch of water cress. There used to be a small lagoon here, supporting a colony of minnows and frogs, but unaccountably the bottom fell out and the lagoon went dry 10 or 12 years ago. The thick jungle of brush and trees around the spring is a hiding place for deer, half-wild cattle and burros, many birds, an occasional coyote or a wildcat.

The banks of White Rock Canyon are honey-combed with the burrows of beaver and muskrat, in large numbers. It would seem likely, though there is no actual record of such visits, that early American fur trappers prowled through the canyon in search of beaver. James Ohio Pattie trapped beaver all over New Mexico from 1824 to 1828. It is of record that Kit Carson, then a youth, was a member of another party which trapped on the Rio Grande, the Colorado and the Gila in 1826. Beaver now are on the increase, according to the State Game and Fish Commission, to such an extent they have become a nuisance in some areas. A license for trapping and some tips on the art of catching beaver, as well as what to do with the pelts, can be obtained from the Commission.

If you have never looked into White Rock Canyon from the rim at White Rock or Pajarito Acres, do so soon. It is a sight you will never forget, and it will afford you in addition an insight into history—past, present and future. Like many another bit of unspoiled New Mexico scenery, it will not be long as it is now and will never be the same again.

The Laboratory's



Although it was hundreds of miles from the microwave towers and coaxial cable that made Uncle Miltie a member of millions of families, Los Alamos was a pioneer in the use of television.

The focus wasn't on entertainment, though. Long before most Hill residents had even seen a television picture a small group of LASL scientists and technicians had established what was probably the country's first major use of so-called industrial or closed-circuit television.

This was at busy Pajarito Site (TA-18), where two fatal accidents resulting from direct handling of critical sizes of fissionable material brought a switchover to remote operation.

Manuel Diaz, who became an electronics technician at Pajarito Site after the first Bikini weapons tests, remembers:

"At first there was talk about building periscopes and telescopes to see from the new control rooms to the outlying kivas. We even considered setting up movie cameras, but bursts of radiation would have ruined the film."

The Laboratory's first contact

LASL WAS A PIONEER IN THE USE OF CLOSED-CIRCUIT TELEVISION

Electronic Eyes

with television was in 1946, when some Army experimental equipment was brought in from Hanford, Washington, for the still-abuilding remote control facilities in Pajarito Canyon. The equipment didn't work very well, but was good enough to provoke more interest.

Since neither remotely-operated cameras nor the small vidicon camera tube had been invented yet, the Laboratory in 1947 purchased several standard studio cameras that had been designed for "field use."

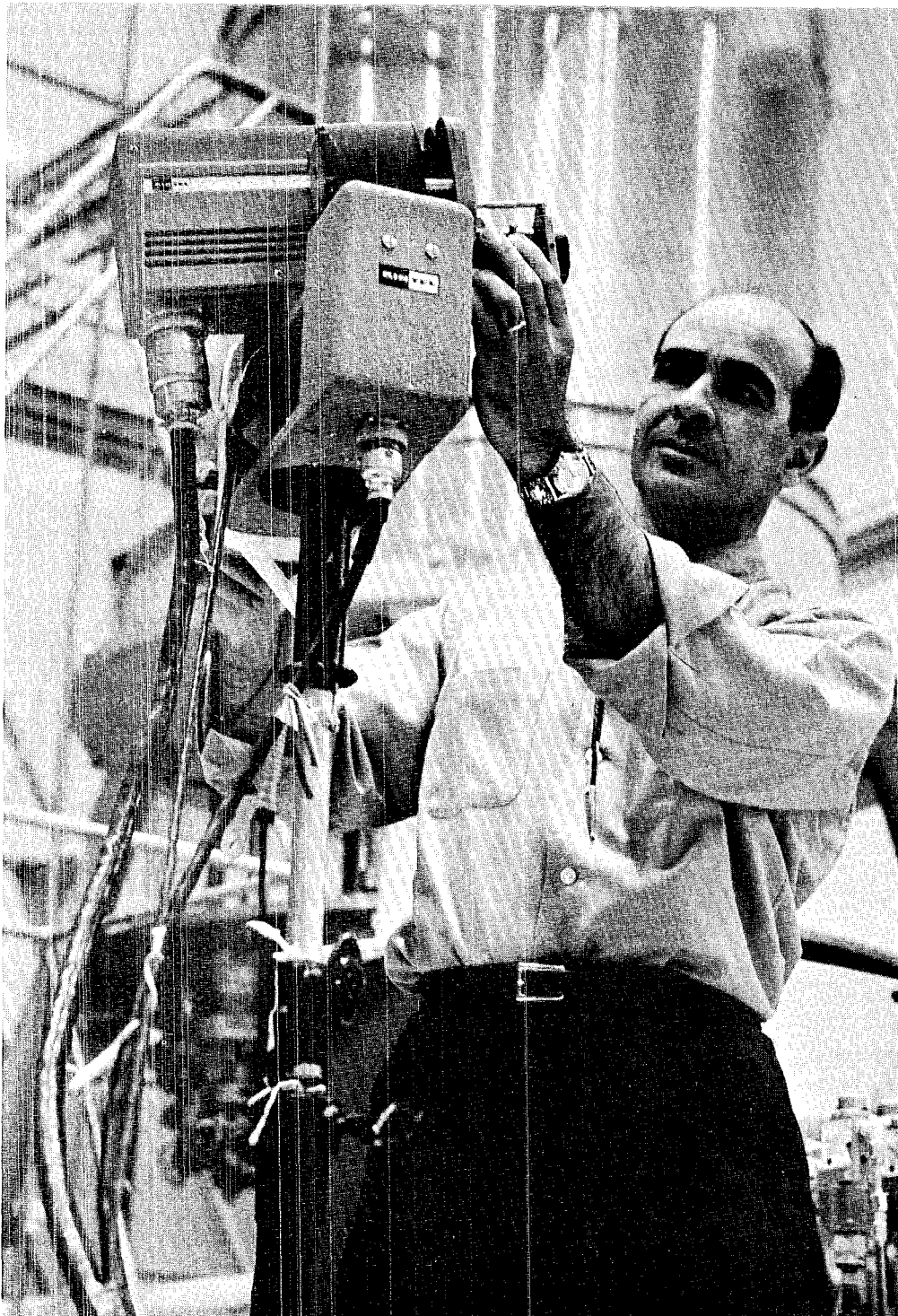
Bulky and heavy they were mounted on heavy wooden tripods. Diaz made some rolled dollies to simplify moving the cameras around in the kivas. When an experiment was ready, the cameras were aimed at the assembly, connected to coaxial transmission line and turned on. Operators made their adjustments and scurried back to the control room—to peer at regular table-model receivers that had been adapted as monitors.

Al Embry, now a J Division staff member was control engineer in those days. "Picture definition was good," he said "but we couldn't change lenses or move in on the subject, and we couldn't pan or tilt during an experiment."

By 1951 the miniature camera tube had been developed and the

continued on next page

One of LASL's 71 television cameras is adjusted by Manuel Diaz for remote operation in Pajarito Site "kiva." Diaz has been technician-in-charge of most of the Laboratory's closed-circuit TV since industrial television had its pioneer application at Pajarito shortly after World War II.



CLOSED-CIRCUIT TV . . .

continued from preceding page

picture changed, literally. Smaller cameras were accompanied by developments in remote control gadgetry. Turret lenses could be rotated, and focus and aperture could be adjusted on electronic command. Lenses became more sensitive and lighting demands were less.

LASL was among the very first customers for RCA's new ITV-1-Industrial Television Model 1. A new Pajarito Site camera had serial number 1001 and vital tubes were marked "experimental." The equipment was so new that operating and service manuals hadn't been prepared. Diaz went to the RCA development center in Camden, New Jersey, to learn how to take care of it.

Unlike the military cameras that had been transferred to DP Site and then sold as salvage, the studio

cameras were purchased by the Crosley Radio Corporation and taken out by air freight in July 1951, for a rush job of telecasting a baseball game in Cincinnati, Ohio.

With its utility and advantages obvious, closed-circuit TV spread through the Laboratory. Today there are 71 cameras and 142 receivers on the Supply and Property books.

Remote machining of explosives at S Site is monitored by television. Detonations at several outlying firing points are seen over television. At Ten Site there is observation of the liquid plutonium pumping operation. Minotaur, the Laboratory's new super-manipulator, has three TV "eyes."

In Nevada, cameras are up close when Kiwi performs. Control room

monitors are also the vantage points for weapons tests.

N-2 Group Leader Hugh Paxton, who has worked with critical assemblies in Pajarito Canyon for almost 16 years, noted that television came along "at just the right time."

"There's no question that it saved us lots of time and was a tremendous aid in reducing the hazards of critical assembly handling.

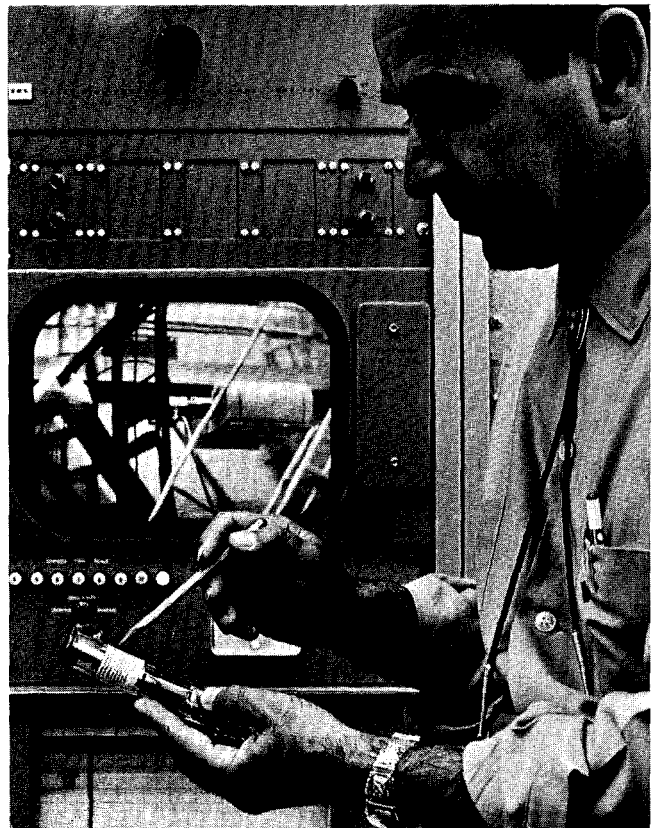
"Even with all our other instrumentation and indicators, the video circuits are the only instruments that enable us to actually see that things are going together as they should," Paxton said.

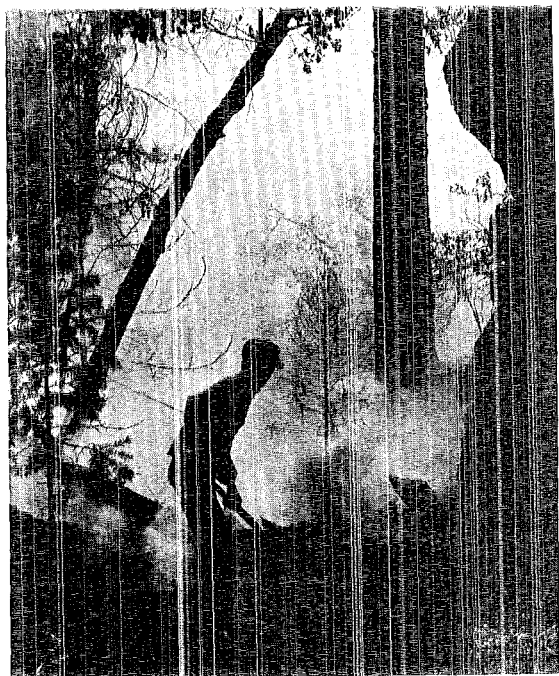
Closed circuit TV has its most Big Brotherish application in Los Alamos performing a duty that has nothing to do with nuclear research:

There are cameras in the cell block at the Los Alamos Police Station. The desk sergeant keeps tab on his "guests" by watching a 13-inch screen.

Vidicon tube held by Manuel Diaz, in Pajarito Site control room, made small television cameras possible.

Closed-circuit video keeps track of molten plutonium pumping operation for Norman Wilson of K-2.





Forest Fire!

Few hazards are greater in the mountains than the danger of forest fire, a condition that reaches its peak in late spring and early summer. This year has been no exception. There have been a number of damaging fires in nearly all forest lands.

Several potentially serious blazes in canyons and brush areas within the community have been knocked down by quick action of the Fire Department. These pictures were made June 20 as firemen battled flames and smoke that started in brush but spread to trees in the woods just west of Los Alamos' Western Area.

Officials have reminded that persons responsible for uncontrolled fire on federal land are liable for the cost of putting down the blaze and the resultant damages.



The Technical Side

International Symposium on Surface Contamination, Gatlinburg, Tennessee, June 8-12:

"Evaluation of Sr^{90} Y^{90} Surface Contamination Using Radiation Survey Instruments" by Jerome E. Dummer, Jr., H-1.

"A Study of Beryllium Surface Contamination and Resuspension" by Robert N. Mitchell and Bernard C. Eutsler, both H-5.

Third Symposium on Engineering Problems in Thermonuclear Research, Munich, Germany, June 21-25:

"The Power Crowbar Energy System for Scylla IV" by Edwin L. Kemp, P-16, and Warren E. Quinn, P-15.

Molecular Spectroscopy Symposium, Ohio State University, Columbus, June 15-19:

"A Perturbation Method Suitable for Higher Order Calculations" by James D. Louck, T-12.

"Eigenvectors of a Slightly Asymmetric Rotator" by James D. Louck, T-12.

American Chemical Society, Local Section Meeting, June 12:

"Intermediates in Aqueous Oxidation-Reduction Reactions" by Thomas W. Newton, CMF-2.

Presentations at Catholic University of America, New York University and Princeton University, May 28-June 3:

"Observation of Cyclotron Harmonics Emitted by the Collective Modes of a Laboratory Plasma" by Harry Dreicer, P-14.

5th Plansee Seminar-Reutte, Tyrol, Austria, June 22-27:

"The High Temperature Chemistry of Refractory Carbides as Determined by High Temperature Techniques" by Melvin G. Bowman, CMB-3.

American Physical Society Meeting, Denver, Colorado, June 25-27:

"Shock Compression of Liquid Carbon Tetrachloride and Benzene" by Richard D. Dick, GMX-4.

"Polymorphic Transitions in the Fe-V Alloy System" by Thomas R. Loree, GMX-4.

"Radiations of Pr^{146} " by William R. Daniels and Darleane C. Hoffman, both J-11.

"Plasma Potential and Instability Measurements on an Injected Plasma Cusped Field Geometry" by John E. Osher, formerly P-14.

" $7\frac{1}{2}$ MeV H Ions Produced by Direct Extraction in the Terminal of a Van de Graaff" by Joseph L. McKibben, R. K. Beauchamp, Richard Woods and Harold J. Lang, all P-9.

"Behavior of Plasma Injected into a Stuffed Cusp Confinement System" by Louis C. Burkhardt, John McLeod, James A. Phillips and Arthur H. Williams, all P-14.

"Ion Leakage from Plasma Injected into a Static Cusped Magnetic Field" by Hugh J. Karr, P-14.

"Spatial Distributions and Lifetimes of Ions Injected Into a Magnetic Cusp" by James A. Phillips and Arthur H. Williams, both P-14.

"X Rays Associated with a Plasma in a Cusped Magnetic Field" by John McLeod, P-14, and Donald C. Hagerman, P-11.

Ninth Annual Meeting of the Health Physics Society, Cincinnati, Ohio, June 14-18:

"Application of Regression Analysis to the Power Function" by Paul C. McWilliams of T-1, John E. Furchner and Chester R. Richmond, both H-4.

"Determination of Plutonium in Urine by Anion Exchange" by Evan E. Campbell and William D. Mass, both H-5.

"Excretion of Cesium-137 as a Function of Age in Mice" by John E. Furchner and Chester R. Richmond, both H-4, and Paul McWilliams, T-1.

12th Annual Conference on Mass Spectrometry, Montreal, Canada, June 7-12:

"The Effect of a Temperature Gradient on the Apparent Pressure in a Knudsen Effusion Cell" by Edmund K. Storms, CMB-3.

7th Meeting of the Coated Particle Fuels Working Group, Westinghouse Astronuclear Laboratory, Large, Pa., May 20 (Classified Meeting):

"Development of . . . Particles" by R. J. Bard, CMB-8.

American Nuclear Society Meeting, Philadelphia, Pa., June 14-18:

"Optimal Control of Nuclear Reactor Systems" by Ronald R. Mohler, N-4.

"Analytic Solutions for the Worth of a Ring of Control Rods in a Multi-region Cylindrical Reactor" by Byron M. Carmichael, K-1.

"Nuclear Characteristics of Some Molten Pu-Fueled Breeder Systems" by William H. Hannum, K-1.

NEW HIRES

Thomas Edward Leonard, Los Alamos, CMB-AS.

Clifford Bernard Boehmer, Las Vegas, Nevada, J-17, NRDS.

Nels Anders Broste, Las Vegas, Nevada, J-17, NRDS.

David Allen Smith, Blair, Nebraska, H-4.

Ned Arthur Daugherty, Fort Wayne, Indiana, CMF-2 (Rehire).

John Henry Steinle, III, Austin, Texas, WSD.

Melvin Hugo Rice, Los Alamos, GMX-6 (Rehire).

Benjamin Avenicio Herrera, Española, N.M., CMB-6.

Richard John Servas, Akron, Ohio, D-10.

James Martin Mahan, Chicago, Illinois, D-3.

WHAT'S DOING

All times listed
are Mountain Daylight Time

DON JUAN PLAYHOUSE: Seventh season. Outdoor theater between Los Alamos and Santa Fe, near San Ildefonso Pueblo. Tickets, \$2, at box office, at Decol's in Los Alamos, and *Interior Accents* in Santa Fe. Curtain 9:15 MDT.

Friday, Saturday, July 3 and 4, "William Shakespeare: What's in a Name?"

Friday, Saturday, July 10 and 11, "Miracle Worker."

Friday, Saturday, July 17 and 18, "William Shakespeare: What's in a Name?"

Friday, Saturday, July 24 and 25, "Shot in the Dark."

Friday, Saturday, July 31 and August 1, "Miracle Worker."

SANTA FE OPERA: Tickets, at \$2.80, \$4, \$4.50, \$5.50, \$6.80, available at Los Alamos Building & Loan, Tuesdays and Thursdays, 10 a.m. to 1 p.m. Opera curtain time 9:30 p.m. MDT.

Friday, July 3, "The Marriage of Figaro."

Saturday, July 4, "Rigoletto."

Wednesday, July 8, "The Marriage of Figaro."

Friday, July 10, "Carmen."

Saturday, July 11, "The Marriage of Figaro."

Wednesday, July 15, "Carmen."

Friday, July 17, "Rigoletto."

Saturday, July 18, "Carmen."

Wednesday, July 22, and Friday, July 24, "Gianni Schicchi" and "L'Enfant et les sortilèges."

Saturday, July 25, "Carmen."

Wednesday, July 29, and Friday, July 31, "Daphne."

Saturday, August 1, "La Bohème."

FILM SOCIETY: Civic auditorium. Films shown 7 and 9 p.m. unless otherwise noted. Admission by season ticket, now priced at \$2, or 90 cents single admission.

Wednesday, July 15, "The Suitor." French comedy, 83 minutes.

Wednesday, August 5, "Knife in the Water." Polish drama, 95 minutes.

LOS ALAMOS HIGH SCHOOL POOL: Summer schedule for public swimming. Adults 35 cents, students 15 cents.

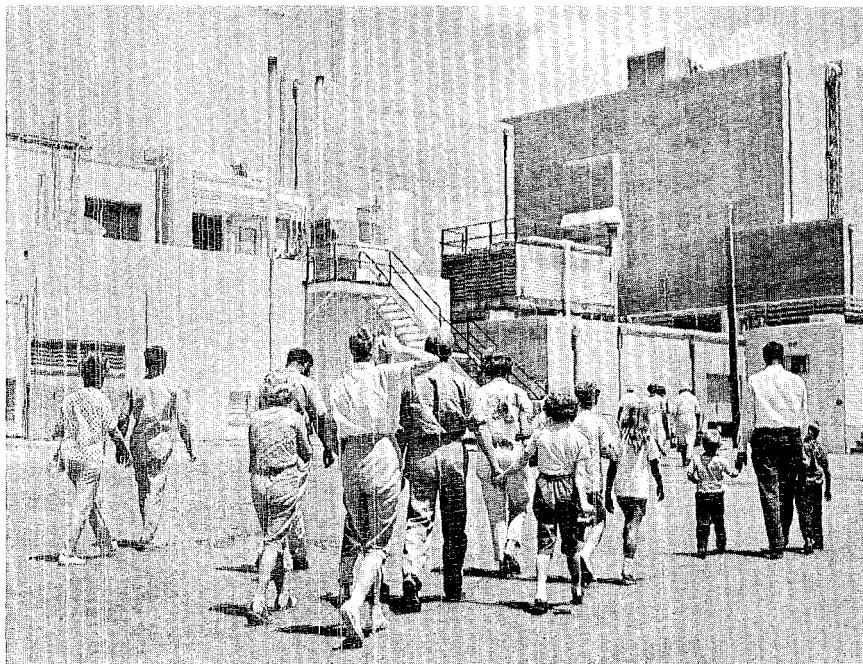
Monday through Friday, 2 to 10 p.m.

Saturday and Sundays, 1 p.m. to 6 p.m.

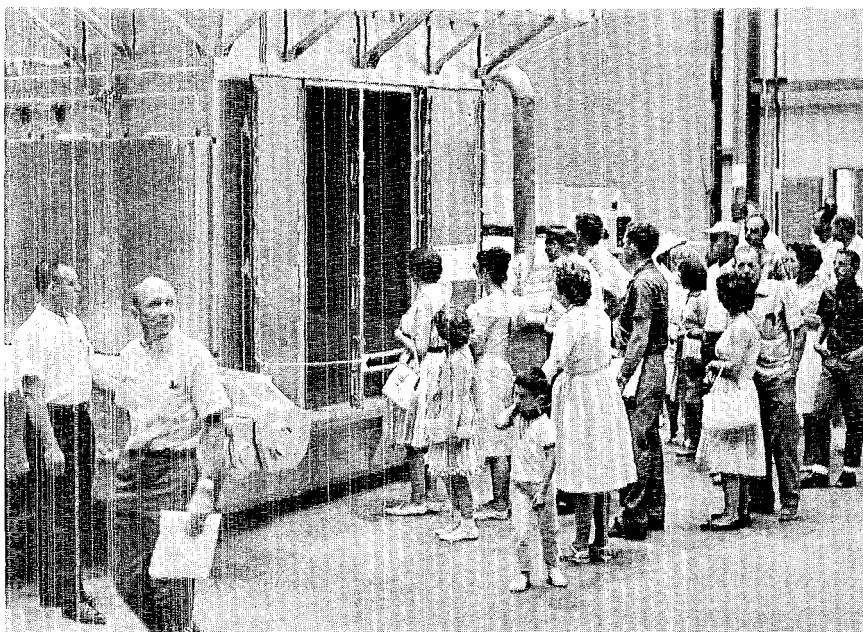
INTERNATIONAL FOLK DANCE CLUB: Open to the public. Meets every Tuesday, 8 p.m., Recreation Hall.

SWIMMING CLUB OF LOS ALAMOS, INC., Membership open to adults interested in swimming. Club meets every Sunday, 7 to 9 p.m.

1,600 Tour NRDS



Some 1,600 visitors toured the Nuclear Rocket Development Station, June 13 and 14, as the site cooperated in the observance of the Nevada Centennial. Visitors drove their own vehicles the 90 miles from Las Vegas. It marked the first time NRDS has been opened to the general public. Here, some of the visitors are shown entering the R-MAD building (above) and examining a Kiwi test car in the building's assembly bay.



Six Employees Retire

LEROY FRANCIS, senior buyer with the Laboratory's Los Angeles Purchasing Office, retired June 30. He began his LASL employment with that office as a buyer in November, 1947. For the time being, he says, he and his wife, Gertrude, "are just going to retire." Later, they plan to travel in the western states and see some of the sights near their home town of Claremont, California.

ANTONIO ARCHULETA, a life-long resident of New Mexico and a 15-year Laboratory employee, retired June 30. He worked for GMX-3, most recently as a truck driver's helper. Archuleta and his wife, Alcarita, live in Dixon.

MAIDIE NUNN has already resumed a painting career which was interrupted by her 14-year-long employment as a first aid nurse at DP West. Retiring from LASL June 30, she left the next day for Columbus, New Mexico, where she has opened a "living studio." Originally from Texas, Miss Nunn lived for several years in Washington, D.C., where she took her nurses' training.

ROBERT D. FOX, SD-O tool crib supervisor, retired June 30 after completing nearly 21 years with the Laboratory. With his wife, Katheryn, Fox plans to travel for about the next year in Europe and this country. Their son, William, is a glassblower in group SD-3.

PAUL C. OLIVAS, a 21-year LASL veteran, plans to "stay right here in Los Alamos." Before retiring June 30, Olivas worked in group P-3 as an instrument machinist-technician. He and his wife, Ernestine, have four children. A son, Peter, works for GMX-8.

CHARLES I. MITCHELL, JR., retired May 22 as a chemical operator in GMX-3. He and his wife, Sallie, have moved to Marshall, Missouri, where Mitchell will enroll in Missouri Valley College. He plans to earn a primary education certificate in a year and return to New Mexico to teach in an elementary school. Mitchell worked for the Laboratory from early 1955. A son, Charles, is employed in LASL's group N-1.

Eleven Get UNM Degrees

Ten LASL employees and one former employee received degrees at the University of New Mexico's 72nd commencement June 7. All of the Los Alamos people fulfilled their degree requirements in some way through courses offered by the Los Alamos Graduate Center.

Highest academic honor went to Richard L. Crawford, P-1, who received the doctor of science in electrical engineering.

Five employees received the master degree in nuclear engineering. They are Bert R. Dennis, J-8; Robert L. Desjardin, J-8; Homer D. Lewis, CMF-13; James R. Ruhe, GMX-11, and James M. Williams, K-3.

Master's degrees in physics were awarded to Thomas D. Butler, T-3, and Philip W. Kidd, Jr., J-12.

Joseph C. McGuire of K-2 won his master's in chemistry.

More than 40 hours of coursework through the Graduate Center and, since 1960, additional course-

work and residency on campus brought a bachelor's degree in mathematics to Ellery Storm of H-1.

Charles A. Mosey, formerly of GMX-5, completed more than two years of academic work through the Graduate Center and terminated in 1962 to attend the University fulltime in Albuquerque. He received his B.S. in electrical engineering.

The laboratory has provided an opportunity for its employees to do evening study toward an academic degree since 1950. The Los Alamos faculty has included both LASL staff members and other professors who commuted to Los Alamos from Albuquerque for each class session. At least one academic year of residence on campus in Albuquerque is required for the Ph.D. or Sc.D, and some part of the undergraduate senior residence requirement must be met by employees seeking the B.A. or B.S.

A total of 99 employees have graduated from UNM since 1954 with a significant part of their coursework coming through the Graduate Center. This figure includes 17 at the doctoral level, 68 masters and 14 B.S. or B.A. degrees.



Seventeen-year-old Elaine Leachman, 1964 honors graduate of Los Alamos High School, was cited as a Presidential Scholar. Elaine and her parents, Mr. and Mrs. Robert Leachman, flew to Washington, D.C., June 10 where Elaine was a White House guest of President and Mrs. Johnson. Only 21 Presidential Scholars were chosen from the nation's 30,000 high schools. Except for a lone "B" in a correspondence course, Elaine had nothing but "A" grades

during her entire high school career. She attended school in Denmark in 1962-63 while her father, a P Division staff member, was doing research in Copenhagen. In addition to her academic prowess, Elaine speaks four languages and enjoys teaching guitar to a Los Alamos neighbor, three-year-old Carol Warren, as illustrated in this photograph. Elaine plans to enter Stanford University this fall and study for a career as a language instructor.



Photographic interpretation by William Thomson

Henry T. Motz
3187 Woodland
Los Alamos, New Mexico

Post-doctoral appointments
at Los Alamos are available
for the first time to young
scientists and engineers.

Elementary particle research,
plasma physics, space physics,
molecular and cellular biology,
and cryogenics are among
the areas of opportunity.
This new program extends
the Laboratory's tradition
of fundamental research.

*Qualified applicants interested
in research at Los Alamos are
invited to send resumes to:
Director of Personnel,
Division 64-33*



All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin. U. S. citizenship required.